A New species of Viola (Violaceae): V. ulleungdoensis M. Kim & J. Lee

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ABSTRACT: A new species, Viola ulleungdoensis M. Kim & J. Lee is named and described from Is. Ulleung, Gyeongsangbukdo Province, Korea. Molecular data confirmed that this new taxon was distinguished from other congeneric species. The Viola ulleungdoensis shares several characteristics (acaulescent leaves, beardless lateral petals, glabrous petioles and peduncles, etc.) with its related species V. selkirkii, but is distinct from V. selkirkii which has present adventitious buds, same leaves after flowering, small leaves, and high altitude habitats by having absent adventitious buds, larger leaves after flowering, large leaves, and low altitude habitats.

Keywords: Viola ulleungdoensis, V. selkirkii, Violaceae

제비꽃속(제비꽃과)의 신종:
울릉제비꽃(Viola ulleungdoensis M. Kim & J. Lee)

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적요: 울릉도에서 제비꽃속의 신종인 울릉제비꽃(Viola ulleungdoensis M. Kim & J. Lee)을 새로이 발견하여 기재하였다. 분자생물학적인 결과는 울릉제비꽃이 근연종들과 구별되는 신종임을 지지해 주었다. 울릉제비꽃은 무경종이고 측화판 기부에 털이 없으며 암병과 화경에 털이 없어 외제비꽃과 유사하다. 그러나 울릉제비꽃은 무경가 있고 개화 후 잎이 커지며 식물체가 크고 저지대에서 자라는 반면에, 외제비꽃은 무경가 있고 개화 후 잎이 커지지 않으며 식물체가 작고 고지대에서 자라 두 종이 틀리게 차이가 난다.

주요어: 울릉제비꽃, 외제비꽃, 제비꽃과

The genus Viola L. (Violaceae) consists of approximately 550 species and is distributed primarily in temperate regions of the Northern Hemisphere (Chen et al., 2007).

The genus Viola are characterized by a solitary flower, zygomorphic flowers with spur, and capsule fruit (Lee and Yoo, 2007). Thirty eight taxa of Viola are distributed in Korea (Lee and Yoo, 2007). Of 38 taxa, Viola chaerophylloides (Regel) W. Becker and V. manshurica W. Becker occur widely in Korea, while V. websteri Hemsl. and V. kapsanensis Nakai are rather rare and sporadically distributed.

Ulleung Island is a volcanic island located 150 km east of Korea in East Sea between the Korean peninsula and Japan Islands, and is 73 km² in area and most of the seashore is composed of steep cliffs. The maximum age of the island is estimated as approximately 1.8 million years old, and has never been connected to any other land mass (Ma et al., 2011). Ulleung Island contains about 700 species of vascular plants, of which 37 angiosperms are endemic (Sun and Stuessy, 1998).

A new species of Viola from Ulleung Island, Gyeongsangbukdo Province, Korea was discovered. Until now, this new species was thought to be V. selkirkii Pursh ex Goldie (Kim, 1986; Park, 1995; Hong et al., 2002) or V. hondoensis W. Becker et H. Boiss. (Lee, 2006). It was published invalidly as Dokdojebikkot without scientific name by Park (2012). The new species shares several characters with its related species, V. selkirkii, but it can be distinguished based on adventitious buds (i.e., absent), leaves after flowering (i.e., larger), leaf size

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(i.e., large), habitats (i.e., low altitude), etc. Thus, we named this new taxon as the *Viola ulleungdoensis* M. Kim & J. Lee. Also molecular data confirmed that *Viola ulleungdoensis* is a new species and distinguished from its related species (M. Kim et al., unpubl. data).

1. *Viola ulleungdoensis* M. Kim & J. Lee, sp. nov. (Fig. 1A-F, 2, 3)

Korean name: Ulleung-Jebikkot 울릉제비꽃

Herba perennis, acaule, sine gemmae adventitiae, 12-20 cm alta. Rhizoma breve, crassus. Folia basalis, numerosus; stipulae adnatae ad petioli, 1.0-1.5 cm; petioli glabra, 7-9 cm longi; lamina ovatus, 5.5-8.5 cm longa, 4.5-6.0 cm lata. supra pubesenti, subtus glabra. Pedicelli 8-11 cm, glabra; bracteae linearis, 8-10 mm. Sepala 5, viridis, 0.9-1.2 cm in length. Petals 5, purple; 2 upper one 13-17 × 7-9 cm; 2 lateral one beardless, 15-19 × 5-9 mm; 1 lower one 8-12 × 5-9 mm; spur 8-12 mm. Stamens 5. Pistil 1; ovary glabrous; style clavate; stigna capitatus, beaked in front. Capsule obovatus, 7-9 mm, glabrous; seed numerous, brown. Flowering April.

Type Locality: Is. Ulleung, Gyeongsangbukdo Province, Korea.


![Fig. 1. A-F. Photographs of *Viola ulleungdoensis* M. Kim & J. Lee at type locality. A. adult plants; B. habitat; C. root; D. front of flower; E. bracteole; F. leaf blade abaxial surface; G. Photographs of *Viola ulleungdoensis* M. Kim & J. Lee for. *albiflora* M. Kim at type locality. Scale bars 2 cm in A; 2 cm in C; 5 mm in D; 5 mm in E; 2 cm in F; 5 cm in G.](image-url)

Flowering: April


Etymology: The specific epithet is derived from Ulleung Island where this new species is located.

Habitats: Mt. Seonginbong area in Is. Ulleung has deciduous broad-leaved forest comprising Fagus multinervis, Acer okamotoanum, and Acer takesimense. This species also occurs with other herbaceous species dominated by Hepatica maxima, Trillium tschonoskii, Viola kusanoana, and Disporum sessile.

2. Viola ulleungdoensis M. Kim & J. Lee for. albiflora M. Kim for. nov. (Fig. 1G)

Korean name: Huin-Ulleung-Jebikkot 홑울릉제비꽃

Forma affinis Viola ulleungdoensis M. Kim & J. Lee, sed differt a forma flores albi.

This form looks like Viola ulleungdoensis M. Kim & J. Lee, but it has white flowers.
A New species of Viola (Violaceae): *V. ulleungdoensis* M. Kim & J. Lee

**Type Locality:** Is. Ulleung, Gyeongsangbuk-do Province, Korea.


**Flowering:** April

**Distribution:** Is. Ulleung, Gyeongsangbuk-do Province, Korea.

**Key to Viola ulleungdoensis and its related taxa.**

1. Petals yellow ···························
2. Petals purple or white

2. Cauline leaves present ·····························
3. Cauline leaves absent

3. Stigma rounded capitate ·····························
4. Stigma margined capitate

4. Stipules free ·········································
5. Stipules adnate to petioles

5. Ovary pubescent ·········································
6. Ovary glabrous

6. Leaf blade ovate or cordate

7. Flowers white ·········································
8. Flowers purple

8. Long trichomes absent at petioles

9. Lateral petals beardless, abaxial leaf blades glabrous

10. Adventitious buds absent, leaves after

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Fig. 3. Holotype of *Viola ulleungdoensis* M. Kim & J. Lee.
Molecular data provided some insights into the taxonomical position of *Viola ulleungdoensis* M. Kim & J. Lee. For example, nrDNA ITS and plastid *trn*L-*trn*F intergenic spacer sequences suggested that *Viola ulleungdoensis* is an independent species and distinguished from its related species, *V. selkirkii* (M. Kim et al., unpubl. data).

**Acknowledgement**

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**Literature Cited**


### Table 1. Comparison of morphological characters between *Viola ulleungdoensis* and its related species *V. selkirkii*.

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>Viola ulleungdoensis</em></th>
<th><em>V. selkirkii</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant size</td>
<td>large</td>
<td>small</td>
</tr>
<tr>
<td>Adventitious buds</td>
<td>present</td>
<td>absent</td>
</tr>
<tr>
<td>Cauline leaves</td>
<td>absent</td>
<td>absent</td>
</tr>
<tr>
<td>Leaves after flowering</td>
<td>same</td>
<td>same</td>
</tr>
<tr>
<td>Stipules</td>
<td>adnate</td>
<td>adnate</td>
</tr>
<tr>
<td>Petiole</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Petiole length</td>
<td>8±1.0*</td>
<td>6±1.2</td>
</tr>
<tr>
<td>Leaf blade shape</td>
<td>large cordate</td>
<td>small cordate</td>
</tr>
<tr>
<td>Leaf blade abaxial surface</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Leaf blade length</td>
<td>7.1±1.2**</td>
<td>3.5±0.7</td>
</tr>
<tr>
<td>Leaf blade width</td>
<td>5.0±0.5</td>
<td>2.6±0.5</td>
</tr>
<tr>
<td>Peduncle</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Bracteoles</td>
<td>linear</td>
<td>linear</td>
</tr>
<tr>
<td>Flower color</td>
<td>purple</td>
<td>purple</td>
</tr>
<tr>
<td>Sepals</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Lateral petals</td>
<td>beardless</td>
<td>beardless</td>
</tr>
<tr>
<td>Ovary</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Stigma</td>
<td>capitate</td>
<td>capitate</td>
</tr>
<tr>
<td>Habitats</td>
<td>low altitude (100-600 m)</td>
<td>high altitude (700-1800 m)</td>
</tr>
</tbody>
</table>

* unit is cm
** mean±SD

This new species, *Viola ulleungdoensis* M. Kim & J. Lee was first discovered at Is. Ulleung in Gyeongsangbukdo Province, Korea. *Viola ulleungdoensis* shares several characteristics (acaulescent leaves, beardless lateral petals, glabrous petioles and peduncles, etc.) with its related species *V. selkirkii*. However, it is distinct from *V. selkirkii* which has present adventitious buds, same leaves after flowering, small leaves, and high altitude habitats by having absent adventitious buds, larger leaves after flowering, large leaves, and low altitude habitats. Thus, the authors described this taxon as a new species of the genus *Viola*. 

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